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| 09/998,035 | 11/30/2001 | Yury Kamen | 16159/022001; P6423 | 5998 |

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EXAMINER

STEELMAN, MARY J

| ART UNIT | PAPER NUMBER |
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2191

DATE MAILED: 04/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/998,035

Applicant(s)

KAMEN ET AL.

Examiner

Mary J. Steelman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,8-10,13-15,20-22 and 25-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,8-10,13-15,20-22 and 25-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

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DETAILED ACTION

1. Per Applicant's request, claims 1, 2, 8-10, 13-15, 20-22, and 25-27 are amended. Claims 1-27 are pending.

Drawings

3. In view of Applicants comments, the prior objections to Drawings are hereby withdrawn.

Specification

4. In view of the amendment to the Specification, the prior objection is hereby withdrawn.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2, 4-10, 13-22, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,321,240 B1 to Chilimbi et al., in view of US Patent 6,098,064 to Pirolli et al.

Per claim 1:

A method for transparently optimizing data access, comprising:

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(Abstract, lines 1-3, "Fields which are individually addressable data elements in data structures are reordered to improve the efficiency (optimizing)...", col. 1, lines 12-15, "This invention relates generally to the field of computer memory management and in particular to optimizing cache utilization by modifying data structures.", col. 20, lines 11-30, "...method...", col. 19, line 66- col. 20, line 1, "...technique reduces cache miss rates...and improves program performance...as compared to the commonly used alternative.")

-gathering information related to data usage when a system is processing...;

(Col. 2, lines 37-38, "The partitioning is based on profile information about field access counts (data usage)", col. 16, lines 63-66, "The design and implementation of a low-overhead, real-time data access (data usage) profiler...")

Chilimbi failed to provide specific details regarding "using a client runtime" when gathering information. Chilimbi disclosed, col. 2, lines 37-38, "The partitioning is based on profile information (gathered usage patterns) about field access accounts", but failed to provide specific details regarding "determining a usage pattern of the system using gathered information."

However Pirolli disclosed (col. 4, lines 13-14) "The prefetch and cache module (hereinafter the P&C module) (a client runtime: as defined by the Specification, it gathers information and generates usage patterns)" Col. 6, lines 17-25: The P&C module waits for a command, a document request by a client. Col. 6, lines 57-58: The fetched document is added to the 'document needs list' and a recording in the (col. 6, line 62-63) history data structure of a

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document data structure is entered . See FIGs. 6 & 7. Col. 10, lines 14-16, "...the needs list is sorted by highest need probability (determining a usage pattern of the system using gathered information)...those documents with the greatest probability of being needed by the user are located at the top of the list..." Col. 10, lines 21-23, "...the P&C module proceeds to fill cache with those documents having the highest need probability in the sorted needs list. Thus the P&C module is a 'client runtime'. It gathers information and generates usage patterns, are used with a cache policy to optimize data accesses.

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Chilimbi's invention which optimized cache utilization by including the teachings of Pirolli, which more specifically detail how information is gathered and processed to determine usage patterns of the system, because both inventions are concerned with improving (Chilimbi: col. 1, lines 51-53) (Pirolli: col. 1, lines 26-27) the performance / speed of delivery of data. Pirolli provided more specific details.

Per claim 2:

-pre-fetching data determined by the usage pattern of the system;

(Pirolli: Col. 10, lines 21-23, "the P&C module proceeds to fill cache (pre-fetch) with those documents having the highest need probability in the sorted needs list (by the usage pattern of the system).")

-caching data locally in a cache associated with the system;

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(Pirolli: See FIG. 3, #202 – Prefetch module cache associated with the system)

-accessing data from the cache;

(Pirolli: See FIG. 3, Client computers #102 access data from the cache, #202)

-synchronizing cached data with persistent data.

(Pirolli: See FIG. 6, #606 – Is The Document Current?, No?, #610 Fetch Document from Web Server.)

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Chilimbi's invention which optimized cache utilization by including the teachings of Pirolli, which more specifically detail using a policy to cache locally, permitting clients to access the cache and maintaining synchronization for an optimal system, because both inventions are concerned with improving (Chilimbi: col. 1, lines 51-53) (Pirolli: col. 1, lines 26-27) the performance / speed of delivery of data. Pirolli provided more specific details.

Per claim 4:

-generating tests for the system by retaining the usage pattern over a period of at least one execution of the system.

(Col. 10, lines 7-17, "...while running the application...a data element...is tracked...A constraint on reordering this element may then be associated with that data element during a second run...(using retained usage patterns)")

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Per claim 5:

-usage pattern comprises pieces of information used together based on a relationship.

(Col. 4, lines 7-9, "...division of a class into two classes comprising hot access fields and cold access fields with an added level of indirection to the class containing cold access fields..."

Information gathered into hot classes have the relationship of being frequently accessed.)

Per claim 6:

-the relationship is temporal.

(Col. 6, lines 30-37, "This results in a high temporal access affinity...", col. 6. line 50, "...derive desired temporal affinities.")

Per claim 7:

-the relationship is causal.

(Col 6, lines 51-54, "A trace may also be used to collect temporally correlated reference data (causal relationship) if desired by tracing all memory references and using a sliding time window to identify references to each other...")

Per claim 8:

-deriving an initial usage pattern from application code analysis.

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(Col. 6, lines 60-65, “Static program analysis (initial usage patterns)...Such analysis can range from...tools written to analyze program data structure usage.”, col. 10, lines 18-19, “...statically analyzing...”)

Per claim 9:

-deriving an initial usage pattern from an empty set.

(Col. 6, lines 66-67 , “A field affinity graph is constructed by bbcache as shown in FIG. 3.” An empty set is used for the first profiling.)

Per claim 10:

-deriving an initial usage pattern from a specification of the system.

(Col. 10, lines 7-17, “...A constraint on reordering this element may then be associated with that data element during a second run through the layout process (specification)...”

Per claim 13:

A method for transparently optimizing data access, comprising:

- gathering information related to data usage when a system is processing using a client runtime;
- determining a usage pattern of the system using gathered information;
- pre-fetching data determined by the usage pattern of the system;
- caching data locally in a cache associated with the system;
- accessing data from the cache;
- synchronizing cached data with persistent data.

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(See limitations addressed in the rejection of claims 1 & 2 above.)

Per claim 14:

A method for transparently optimizing a distributed application having a client-side and a server-side, comprising:

(Col. 5, lines 19-23, "Personal computer may operate in a networked environment...Remote computer may be...a server, a router...", col. 5, lines 29-31, "Such networking environments are commonplace in offices, enterprise-wide computer networks...")

-gathering information related to data usage on the client-side when the distributed application is processing using a client runtime;

-determining a usage pattern using gathered information.

(Chilimbi suggests that his invention is suitable for a business environment. The limitations for gathering information related to data usage and determining a usage pattern are addressed in claim 1 above.)

Per claim 15:

-pre-fetching data from the server-side using the usage pattern and a server runtime;

-caching data on the client-side in a cache associated with the client-side;

-accessing data on the client-side using the cache;

-synchronizing cached data on the client-side with persistent data on the server-side.

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(See limitations addressed in the rejection of claim 2 above.)

Additionally, Pirolli disclosed, col. 11, lines 18-19, "The method set forth above for prefetching and caching documents at a client computer (client-side)..."

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Chilimbi's invention which optimized cache utilization by including the teachings of Pirolli, which more specifically detail using a policy to cache locally, permitting clients to access the cache and maintaining synchronization for an optimal system, because both inventions are concerned with improving (Chilimbi: col. 1, lines 51-53) (Pirolli: col. 1, lines 26-27) the performance / speed of delivery of data. Pirolli provided more specific details.

Per claim 16:

-the usage pattern comprises pieces of information used together based on a relationship.

(See limitations addressed in the rejection of claim 5 above.)

Per claim 17:

-the relationship is temporal.

(See limitations addressed in the rejection of claim 6 above.)

Per claim 18:

-the relationship is causal.

(See limitations addressed in the rejection of claim 7 above.)

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Per claim 19:

-the data represents objects.

(Col. 5, lines 60-62, "The notion of an object is exploited in the present invention in that certain aspects of the invention are implemented as objects in one embodiment.", col. 17, lines 8-9, "Profiling can be implemented at object, not filed, granularity.")

Per claim 20:

-deriving an initial usage pattern from application code analysis.

(See limitations addressed in the rejection of claim 8 above.)

Per claim 21:

-deriving an initial usage pattern from an empty set.

(See limitations addressed in the rejection of claim 9 above.)

Per claim 22:

-deriving an initial usage pattern from a specification of the system.

(See limitations addressed in the rejection of claim 10 above.)

Per claim 25:

A method for transparently optimizing a distributed application having a client-side and a server-side, comprising:

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- gathering information related to data usage on the client-side when the distributed application is processing using a client runtime;
- determining a usage pattern using gathered information;
- pre-fetching data from the server-side using the usage pattern and a server runtime;
- caching data on the client-side in a cache associated with the client-side;
- accessing data on the client-side using the cache;
- synchronizing cached data on the client-side with persistent data on the server-side.

(See limitations addressed in the rejection of claims 14 and 15 above.)

Per claim 26:

A computer-readable medium having recorded thereon instructions executable by processing, the instructions for:

(Col. 20, lines 31-54, "...computer readable medium...")

- gathering information related to data usage when a system is processing using a client runtime;
- determining a usage pattern of the system using gathered information;
- pre-fetching data determined by the usage pattern of the system;
- caching data locally in a cache associated with the system;
- accessing data from the cache;
- synchronizing cached data with persistent data.

(See limitations addressed in the rejection of claims 1 and 2 above.)

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Per claim 27:

An apparatus for transparently optimizing data access, comprising:

(Col. 20, lines 55-67, "A computer system (apparatus)...")

-means for gathering information related to data usage when a system is processing using a client runtime;

-means for determining a usage pattern of the system using gathered information;

-means for pre-fetching data determined by the usage pattern of the system;

-means for caching data locally in a cache associated with the system;

-means for accessing data from the cache;

-means for synchronizing cached data with persistent data.

(See limitations addressed in the rejection of claims 1 and 2 above.)

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,321,240 B1 to Chilimbi et al., in view of US Patent 6,098,064 to Pirololi et al, and further in view of US Patent 6,700,590 B1 to DeMesa et al.

Per claim 3:

Chilimbi disclosed (col. 10, lines 7-17), "by retaining the usage pattern over a period of at least one execution of the system". The application is tracked while running, resulting in a new layout and the application is run again.

Although Chilimbi disclosed that his invention was suitable for a business process (col. 5, lines 19-31), "Such networking environments are commonplace in offices, enterprise-wide

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computer networks...”, he failed to disclose “generating a description of a business process model”. However, DeMesa disclosed (col. 2, lines 21-34), a view model to collect and display data from multiple sources. “The data that is collected and displayed by the system may, for example, include...time series data. The system also preferably includes development tools...and views to generate a model of a business entity.

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify the Chilimbi/ Pirolli invention to include the generation of a business entity, as Chilimbi did disclose that his invention was suitable for a business environment, and generating business models is a typical use of information gathered from profiling.

8. Claims 11, 12, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,321,240 B1 to Chilimbi et al., in view of US Patent 6098064 to Pirolli, and further in view of US Patent 6,430,741 B1 to Mattson, Jr. et al.

Per claims 11, 12, 23, and 24:

Chilimbi / Pirolli disclosed a technique for optimizing data access in a system, gathering a usage pattern. Chilimbi / Pirolli failed to disclose “displaying the usage pattern to a display device” or “generating documentation from the usage pattern.”

However, Mattson disclosed a system and method for data coverage (optimizing data access) analysis, including display and documentation. Col. 3, lines 31-36, “...coverage information is read from the merged file using a visualization tool which displays the number of times each element in the data table has been accessed...”, col. 6, lines 31-33, “The coverage

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information is then fed to the visualization tool which produces a visually demonstrative display of the coverage information.”, col. 7, lines 59-63, “...data coverage tables are created to store information relating to data coverage...termination code is added to the program. The termination code writes the coverage information to a file for later examination (documentation).”

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to have included the display and documentation features in the Chilimbi / Pirolli invention, as they are logical, well known techniques for providing information gathered from profiling and presenting the information to a developer. Displaying optimization data is well known in the art.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 3, 11, 12, 13, 14, and 23-27 , have been considered but are moot in view of the new grounds of rejection.

Applicant has argued, in substance, the following:

(A) As Applicant has noted on page 8, 3rd paragraph of Remarks received 15 November 2004, regarding independent claims 1, 13, 14, and 25-27, “Chilimbi does not teach or suggest a method for determining which data to retrieve from a server, or any mechanism corresponding to a client runtime that intercepts calls made to the system.”

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Examiner's Response: The Pirolli reference has been added to supply more specific details. See rejection of claim 1 above. The P&C module intercepts calls.

(B) As Applicant has noted on page 8, 4th paragraph of Remarks, regarding independent claims 1, 13, 14, and 25-27, Chilimbi does not teach a method for "generating a usage pattern"... "that includes the information necessary to determine a set of objects and attributes to pre-fetch (as noted in Specification [0023]: "pre-fetch and store in the client cache")"

Examiner's Response: The Pirolli reference has been added to supply more specific details. See rejection of claim 1 above. Pirolli generates a usage pattern using information from the history of accesses. Col. 10, lines 21-23, "P&C module proceeds to fill cache with those documents having the highest need probability in the sorted needs list."

(C) As Applicant has noted on page 9, 3rd paragraph, regarding claim 3, the Chilimbi / DeMesa combination fails to teach or suggest a client runtime (to intercept calls made to the system) or usage pattern."

Examiner's Response: See rejection of claim 1 above.

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(D) As Applicant has noted on page 10, 1st paragraph, regarding claim 11, 12, 23, and 24, the Chilimbi / Mattson reference “fails to teach or suggest a client runtime or a usage pattern” as recited in amended independent claim 1.

Examiner’s Response: See rejection of claim 1 above.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Steelman, whose telephone number is (571) 272-3704. The examiner can normally be reached Monday through Thursday, from 7:00 AM to 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Tuan

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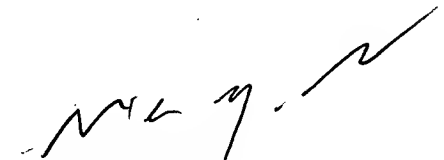
Q. Dam can be reached at (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary Steelman

03/31/2005



WEI Y. ZHEN
PRIMARY EXAMINER